



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/848,773	05/03/2001	Qian Chen	06666/076001/USC-2892	6630
20985	7590	12/09/2005	EXAMINER	
FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022				NGUYEN, KIMBINH T
ART UNIT		PAPER NUMBER		
				2671

DATE MAILED: 12/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/848,773	CHEN ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Kimbinh T. Nguyen	2671

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 19 September 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-24, 29-39 and 43-63 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) 1-24 and 43-49 is/are allowed.
- 6) Claim(s) 29-39 and 50-63 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

1. This action is responsive to amendment filed 09/19/05.
2. Claims 1-24, 29-39, 43-63 are pending in the application.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim 50 is rejected under 35 U.S.C. 102(e) as being anticipated by Woodfill et al. (6,456,737).

**Claim 50**, Woodfill et al. discloses obtaining two images of similar image information from sources (col. 10, line 16; col. 11, lines 37-41; col. 13, lines 4-5); superimposing lines formed on the two images to rectify the two images relative to one another to form rectified images (rectify input images; col. 16, lines 25-29); using the rectified images to form 3D information (a final disparity image 290; col. 16, line 26 through col. 18, line 9).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2671

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 29, 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodfill et al. (6,456,737) in view of Greenspan (6,026,189).

**Claims 29, 31, 32, 33, 34,** Woodfill et al. discloses obtaining first and second images of the same object (object 11; col. 12, line 15 through col. 13, line 10); identifying objects in the first and second images (object 11 and background 12 of fig. 1) aligning the lines in an epipolar geometry (epipolar lines; col. 16, lines 27-29); using the first and second images with the aligned lines (the epipolar constraint lines) to form 3D information (a final disparity image 290; col. 16, line 26 through col. 18, line 9). Woodfill does not teach identifying seed voxel; however, Greenspan teaches identifying seed voxel (root node sets contain the original voxel; col. 8, lines 60-65; col. 10, lines 36-39) for different parts of 3D surface with a high probability of being correct 3D which is greater than a specified threshold (greater than 0.99, greater than predetermined threshold); and determining which of two voxel to use at the intersection col. 7, lines 24-25; col. 10, lines 36-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the seed voxel taught by Greenspan into the Woodfill system, because it would provide a method of recognizing objects within image (col. 2, lines 60-61).

7. Claims 30, 35-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodfill et al. (6,456,737) in view of Greenspan (6,026,189) and further in view of VanEssen et al. (6,591,004).

**Claim 30, 35-38,** Woodfil does not teach seed voxel; however, VanEssen et al. teaches forming the surface map by propagating from the seed voxel; determining intersection between two voxels at different parts; determining probability of two voxels finding neighbors for voxels one by one); (col. 25, lines 49-55), and selecting the higher probability as the voxel to use selecting a seed voxel that the best matches the corresponding pixel information and has a probability of being correct which is greater than a specified threshold (col. 26, line 64 through col. 27, line 5); identifying voxels represent incorrect matches and removing incorrect matching voxels (col. 23, lines 27-40). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the tracing voxels and selecting voxels as taught by VanEssen into the method for rectifying images of Woodfill for forming 3D image from 2D similar images, because it would provide a method for reconstructing surfaces and analyzing surface volume representations of the shape of an object corresponding to image data, in which the object has been modeled as one or more physically distinct compartments (col. 2, lines 53-57).

8. Claims 39, 55-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodfill et al. (6,456,737) in view of Greenspan (6,026,189) and Ayache et al. (6,175,648)

**Claim 39,** the rationale provided in the rejections of claim 29 are incorporated herein. In addition, Ayache et al. teaches converting the disparity map into 3D Euclidean points (col. 7, lines 47-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the Euclidean points taught by

Ayache into the rectifying images of Woodfill, because it would produce data which is improved in particular in that it makes easier to establish multi-pair correspondence of images (col. 2, lines 5-8).

**Claims 55-63,** the rationale provided in the rejection of claims 29-39 are incorporated herein.

9. Claims 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodfill et al. (6,456,737) in view Ayache et al. (6,175,648)

**Claims 51- 53,** Woodfill et al. does not teach epipolar transformation; however, Ayache discloses identifying specified points in the images which pass through specified identifiable parts in each of the images (col. 5, lines 1-2); forming lines through the specified points; aligning the lines between the different images by aligning beginnings and ends of the lines; wherein the lines are aligned by using an epipolar transformation (col. 5, lines 8-14); the epipolar transformation is carried using information in the fundamental matrix (col. 5, line 15 through col. 6, line 39). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the epipolar transformation taught by Ayache into the rectifying images of Woodfill, because using epipolar transformation it would define a model for transition from a 3D point in the scene to the coordinates of its projection into each of the rectified images (col. 5, lines 33-35).

10. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Woodfill et al. (6,456,737) in view Ayache et al. (6,175,648) and further in view of Hartley et al. "Stereo from Uncalibrated Cameras", IEEE 1992, pages 761-764.

**Claim 54**, Woodfill et al. does not teach the two images are recovered from two uncalibrated camera; how ever, Hartley et al. teaches this feature (see section 1.3, page 762). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the stereo image from uncalibrated cameras taught by Hartley into the rectifying images of Woodfill, because it would avoid the explicit computation of internal or external camera parameters (see section 1.3).

***Allowable Subject Matter***

11. Claims 1-24, 43-49 are allowed.

***Response to Arguments***

12. Applicant's arguments with respect to claims have been considered but are not persuasive because Kang teaches reconstructing a 3D object image by an uncalibrated camera (col. 1, lines 45-46; col. 3, line 19); closed-loop motions are also possible (alternative method). It means the images taken by an uncalibrated camera and after that performing self-calibration, calibration of camera is not required (col. 3, line 19). Some of the independent claims of the invention also disclose both: obtaining the images from sources, and do not require obtaining two images from uncalibrated sources. Claim 29, Woodfill teaches obtaining first and second images of the same object (object 11; col. 12, line 15 through col. 13, line 10); identifying objects in the first and second images (object 11 and background 12 of fig. 1); Greenspan teaches a volumetric technique (see the Office action). For theses reasons, the rejection of claims 29-39 and 50-63 maintained.

Art Unit: 2671

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimbinh T. Nguyen whose telephone number is (571) 272-7644. The examiner can normally be reached on Monday to Thursday from 7:00 AM to 4:30 PM. The examiner can also be reached on alternate Friday from 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached at (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

December 7, 2005

  
KIMBINH T. NGUYEN  
PRIMARY EXAMINER